

Application No.: 10/050,018

Docket No.: JCLA7948

REMARKS**Present Status of the Application**

The claims 9 and 10 are objected because of some informalities, and the claims 9, 13 and 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite. The Office Action rejected all presently-pending claims 1-14. Specifically, the Office Action rejected claims 1, 2 and 8 under 35 U.S.C. 102(e), as being anticipated by Voldman (U.S. 6,455,902). The Office Action also rejected claims 3-7 and 9-14 under 35 U.S.C. 103(a) as being unpatentable over Voldman. Applicants have amended claims to overcome the objection and have amended claims 3, 6 and 11 to improve clarity. After entry of the foregoing amendments, claims 3, 4, 6, 7, 11 and 12 remain pending in the present application, and reconsideration of those claims is respectfully requested.

Summary of Applicant's Invention

The Applicant's invention is directed to a power-rail ESD protection circuit with a dual trigger design, which is coupled between a first power line and a second power line connected to an IC device for protecting the IC device against ESD on the first power line and the second power line. The proposed power-rail ESD protection circuit comprises a control circuit and at least one MOS device. The control circuit is coupled between the first power line and the second power line, and is able to be triggered by the ESD to output a substrate-triggering voltage and a gate-driving voltage to the MOS device. The circuit configuration of the proposed power-rail

Application No.: 10/050,018

Docket No.: JCLA7948

ESD protection circuit can help reduce the junction breakdown voltage in a MOS device and increase in ESD robustness.

Discussion of objections

According to the OFFICE ACTION, the claims 9 and 10 are objected because of some informalities, and the claims 9, 13 and 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite. However, these claims are cancelled in the response in view of the coverage afforded by the remaining claims. Therefore, the informalities and the indefinite are no longer existed.

Discussion of Office Action Rejections

The Office Action rejected claims 3-7 and 9-14 under 35 U.S.C. 103(a), as being unpatentable over Voldman. Applicants respectfully traverse the rejections for at least the reasons set forth below.

The present invention discloses a power-rail ESD protection circuit in claims 3-4, 6-7, and 11-12, respectively, and those ESD protection circuits can be seen in FIG. 7B, FIG. 7D, and FIG. 8C. In these claims and drawings, one major different between the present invention and Voldman is that *the gate terminal and substrate terminal of the MOS are connected to the lists of diodes* in the present invention, while those are connected to the lists of diodes via an inverter list in Voldman. The inverter list connects between the terminals of the MOS and the diode list suffers from driving delay. The present invention does not utilize the inverter list between the

Application No.: 10/050,018

Docket No.: JCLA7948

terminals of the MOS and the diode list because the gate and substrate of the MOS are biased by different voltages, thus a smaller driving current is needed to drive the MOS and no inverter is needed to amplify the driving current.

Accordingly, the independent claim 3 is patentable over Voldman at least because Voldman does not disclose the feature of “...wherein the positive end of the (A)th diode is connected to the substrate of the NMOS device, and the positive end of the (B)th diode is connected to the gate of the NMOS device...” as claimed in claim 3. The claim 3 provides a faster driving path without using inverter list, which connects between terminals of MOS device and the diode list, by connecting gate and substrate terminals of MOS device to different voltages.

Therefore, *the independent claim 3 is patentable over Voldman* since the Voldman, other references cited by the Examiner and the combination of those citations do not disclose the technique feature stated above.

Since the independent claim 3 is patentable over Voldman, the *dependent claim 4 is patentable over Voldman as a matter of law* at least because the dependent claim 4 includes all technique feature of its depending claim, i.e., claim 3.

For at least the same reasons, independent claims 6 and 11 are patentable over Voldman. Furthermore, dependent claims 7 and 12 are patentable over Voldman as a matter of law since they at least includes technique feature of their depending claims 6 and 11, respectively.

For at least the foregoing reasons, Applicant respectfully submits that independent claims 3, 6 and 11 patently define over the prior art references, and should be allowed. For at least the same reasons, dependent claims 4, 7 and 12 patently define over the prior art as well.

Application No.: 10/050,018

Docket No.: JCLA7948

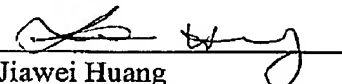
CONCLUSION

For at least the foregoing reasons, it is believed that the pending claims 3-4, 6-7 and 11-12 are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

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Respectfully submitted,
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